U. S. DEPARTMENT OF ENERGY
WORK BREAKDOWN STRUCTURE DICTIONARY
PART II - ELEMENT DEFINITION

1. PROJECT TITLE/PARTICIPANT	2. DATE	3. IDENTIFICATION SITE
Environmental Management/Paducah Remediation Services, LLC (PRS)	6/18/08	Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)

4. WBS ELEMENT CODE	5. WBS ELEMENT TITLE
04.11.03.01	In-Year D&D of C-410

6. INDEX LINE NO.	7. REVISION NO. AND AUTHORIZATION	8. DATE
N/A	Rev. 0	06/18/08

9. APPROVED CHANGES
N/A

10. SYSTEM DESIGN DESCRIPTION	11. BUDGET AND REPORTING NUMBER
N/A	N/A

12. ELEMENT TASK DESCRIPTION

THIS IS A PLANNING LEVEL WBS DICTIONARY

WBS STRUCTURE

The scope of this element includes the following subelements:

WBS 04.11.03.01.01	**Sub-Project Management**
WBS 04.11.03.01.02	**Sector 1 Waste Management**
WBS 04.11.03.01.03	**Sector 2 Asbestos Abatement and Fluorine System Hazard Stabilization**
WBS 04.11.03.01.04	**Sector 3 Asbestos Abatement**
WBS 04.11.03.01.06	**Surveillance and Maintenance & Support Activities**
WBS 04.11.03.01.08	**Sector 4 Fluorine System Stabilization**
WBS 04.11.03.01.09	**Site-wide Surplus Facilities D&D Removal Notification, EE/CA, AM, and C-410 RAWP**
WBS 04.11.03.01.10	**Fluorine (F2) System Hazard Stabilization**
WBS 04.11.03.01.11	**Hydrogen (H2) System Hazard Stabilization**
WBS 04.11.03.01.12	**Hydro Fluoric Acid (HF) System Hazard Stabilization**

INTRODUCTION

The purpose of the Decontamination and Decommissioning (D&D) project is to plan and implement the decontamination, decommissioning, infrastructure removal, and required waste management activities associated with the C-410/420 Complex at the Paducah Gaseous Diffusion Plant (PGDP). Materials generated as a result of the D&D will be dispositioned either through reuse or appropriate disposal pathways. C-410 is inactive and infrastructure removal work is ongoing in accordance with the approved Removal Action Work Plan (RAWP). The facility has been subdivided into sectors and zones to facilitate efficient disposition. Known contaminants include low enriched uranium, transuranics, technicium-99, beryllium dust, asbestos, and polychlorinated biphenyls (PCBs) in paint and potentially in switchgear components. Some systems are known to contain holdup material that will be rendered passive for deactivation prior to component/piping removal. The potential that additional chemical and radiological hazards will be identified during infrastructure removal exists. The facility is a Category 2 nuclear facility with an approved safety basis authorization for infrastructure removal activities.

The C-410 Complex is made up of three primary facilities, all of which are physically connected. The C-410 Building, with the east and west expansions, covers 129,000 square feet, and was used primarily for the conversion of uranium oxides to uranium hexafluoride and for the generation of fluorine. The C-

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420 Building is a multi-story facility, with over 46,000 square feet of floor area. The C-420 Facility was used to convert uranium oxides to uranium tetrafluoride. The C-411 Building is a single story facility, consisting of approximately 6,000 square feet that was utilized for maintenance of fluorine generating cells and equipment.

In addition to the primary building, the C-410 Complex includes the C-410-I Facility, a 2000 square foot structural steel facility with roof and open walls and the C-410-C Limehouse, an 1100 square foot steel frame building with corrugated roof and walls, originally used for neutralization of fluorine cell electrolyte, and most recently used for removal of paint from fluorine cells. The Complex also includes the footprints and concrete foundations of the former C-410-F, G, H, and I Hydrogen Fluoride facilities. The tanks, structures, and piping from these facilities have been demolished and dispositioned, leaving only the concrete perimeter foundations in place.

Figure 1 shows the footprint of the C-410 Complex. Previous projects have completed the demolition of infrastructure in Sector 1 of the facility, and converted the western portion of Sector 1 (Zone 21) and Zone 19 of Sector 7 into a Boundary Control Station and dress out area for personnel working inside the facility.

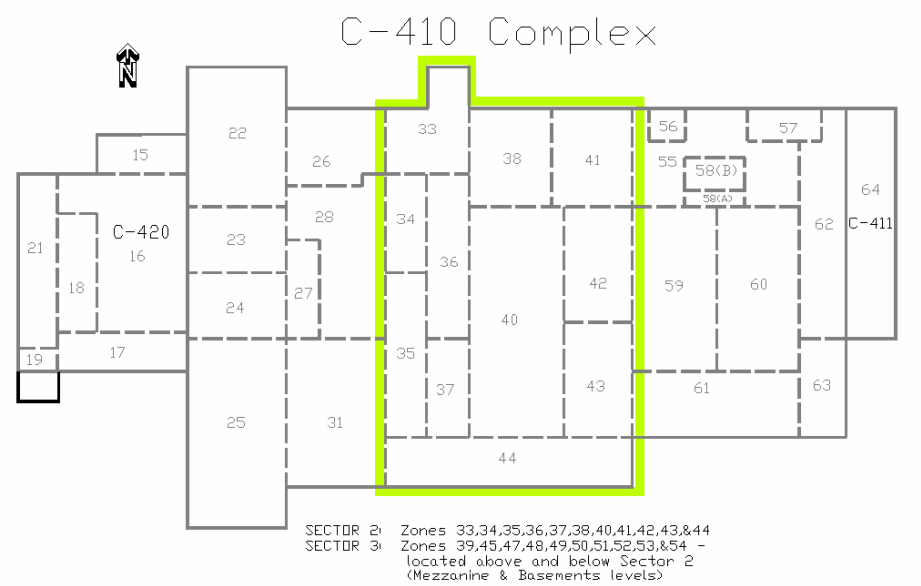

Figure 1. Footprint of the C-410 Complex.

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At the completion of the this WBS element, the following will be the status of the C-410 Complex:

- All accessible asbestos insulation will be removed. Due to obstructions which cannot be removed, such as the presence of process piping containing hazardous materials, structural members, etc, up to 10% of the asbestos insulation and transite will remain in place. Exterior transite walls will remain in place.
- Sector 1, Zone 21, (C-420 Office Area) and Sector 7, Zone 19 will continue to be used as a boundary control station and dress out area. Interior walls, ½ body monitors, lockers, storage cabinets, etc; used to support building entry and exit will remain in place.
- Sector 1, Zone 64 (C-411 Area) will be used for tool and equipment storage, for waste staging, and for a second Boundary Control Station. Interior walls, lights, and tools will remain in place in this area.
- The Portable Criticality Accident Alarm System alarm, horns, and wiring will remain in place.
- Temporary electrical power systems will remain in place, including lighting and power to cranes.
- Exterior doors and windows will remain in place to maintain building integrity.
- Stairwells, handrails, guard rails, and lighting will remain in place in order to provide acceptable work environment for inspections and surveillance and maintenance pending facility demolition.
- Fluorine generation system in Sector 4 will be stabilized; with piping and equipment removed if deposits will prevent the piping from meeting LLW Waste Acceptance Criteria for Energy Solutions or NTS.
- Inventory of remaining non-stationary material and components (items not physically connected to the facility) will be as presented later in this document. Characterization for disposal of this material will be completed for disposal under this WBS Element.
- The following systems will be stabilized in the Sectors as defined. In the table, a C indicates that stabilization and removal will be completed in a Sector, while X indicates that a system will remain in place in that sector. NA indicates the system is not present in that Sector.

System	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8
UF6	X	X	NA	X	X	NA	NA
HF	C	C	C	NA	NA	NA	C
F2	C	C	C	C	C	C	C
H2	NA	NA	C	NA	NA	NA	C
NH3	X	NA	NA	NA	NA	NA	NA
Glycol	NA	NA	NA	X	X	NA	NA
Vacuum	X	X	X	X	X	X	X
Freon	X	NA	NA	NA	NA	NA	NA
Electrolyte	X	X	NA	NA	NA	NA	NA
Alcohol	X	X	NA	NA	NA	NA	NA
Uranium Powder (U02,U03,UF4, Ash Receivers)	NA	NA	NA	X	X	X	X
HVAC	X	X	X	X	X	X	X

- CERCLA documentation for facility demolition (Generic D&D EE/CA and Action Memorandum will be approved by regulatory agencies, and Removal Action Work Plan will be drafted and submitted to regulatory agencies).

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LOGIC RELATIONSHIPS

Interfaces:

Internal to Contractor

- All Contractor project managers and staff
- All subcontractors

External to Contractor

- U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office and support contractors
- DOE Headquarters (HQ) or other DOE Sites (if applicable)
- Environmental Protection Agency (EPA)
- Commonwealth of Kentucky (KY)
- Site tenants including United States Enrichment Corporation (USEC); Uranium Disposition Services, LLC; and Swift and Staley Team (SST)
- USEC services in the area of property, information technology, emergency response, support for Portable Criticality Accident Alarm System (PCAAS) radios, personal protective equipment, etc. This support is provided both through Government Furnished Services and Items, and through work authorizations.
- SST, particularly in the areas of property management, information technology, and security.
- Nevada Test Site (NTS): Profiling and disposition of newly generated and classified and fissile low-level waste (LLW), if required or applicable.
- Energy*Solutions*: Profiling, treatment, and disposition of mixed and LLW, if required or applicable.
- TSCA Incinerator disposal of PCB and radioactive liquids.
- Commercial Treatment Storage and Disposal (TSD) Facility: For treatment and disposal of nonradioactive hazardous waste, if required or applicable.
- Stakeholders
- Citizens Advisory Board and supporting contractor Edward Holmes Incorporated (EHI).
- DOE Integrated Safety Management System (ISMS) Verification Team

Time Sequencing with Other Work:

- Per the FFA and Site Management Plan, the D&D of the C-410 Complex is to be completed by September 30, 2012.
- The Engineering Evaluation/Cost Analysis (EE/CA), Action Memorandum (AM) and Removal Action Work Plan (RAWP) for the facility structure demolition must be submitted as a part of the activities under this element in order to support building demolition according to the FFA and SMP schedule.
- Existing CERCLA documentation covers only the removal of infrastructure (stored material, equipment, piping, ductwork, etc).
- SWMU schedules will be driven by the master facility inspection schedules and the compliance deliverables from the environmental compliance database.
- Asbestos abatement, hazard stabilization and prohibited items removal activities must be completed before Building Demolition can begin.
- First activity necessary for work in a Sector will be the installation of temporary power and lighting, and the demarcation of hazards.
- Crane renovation and recertification will be required in Sectors 5, 6, and 8 before commencing removal of large equipment for stabilization.
- Construction of a passivation structure may be required prior to stabilization of Cold Traps in Sectors 5 and 6.
- The expected sequence of work for D&D activities in each Sector will include verification that

equipment is de-energized, followed by asbestos abatement, followed by hazardous material removal (passivation), preparation for building demolition, and building demolition. Building demolition is outside of the scope of this element.

- In general, entire systems will be stabilized at one time, with higher hazard systems being addressed first. However, the specific sequencing may vary based on available resources and accessibility in specific areas.
- Waste disposition will be performed throughout the project. With the exception of small quantities of waste held until adequate quantities are available for shipment, waste will be dispositioned as characterized.

SCOPE DESCRIPTION

WBS 04.11.03.01.01 D&D of C-410 Subproject Management

Provide overall management activities associated with this subproject. Activities performed under this subelement include the following:

- Perform technical, contractual and project functions necessary to effectively manage and report scope, schedule, and budget;
- Maintain all activities within the defined safety, environmental, and quality requirements;
- Perform technical and personnel management functions;
- Maintain technically qualified and properly trained personnel;
- Develop, evaluate, and report project performance metrics; and
- Interface with DOE, KY, EPA, other prime contractors, and stakeholders, as needed.
- Preparation of a Removal Action Completion Report for the C-410 Complex Removal Actions.

The method(s) used for determining earned value for this WBS element is Level of Effort.

WBS 04.11.03.01.02 Sector 1 Waste Management

Current status of waste associated with Sector 1 is as follows:

- D&D of Sector 1 was completed prior initiation of work on this element, but some of the waste from Sector 1 remained on site for disposition under this element.
- During this effort, 540 cubic feet of material from Sector 1 was disposed at Energy Solutions.

WBS 04.11.03.01.03 Sector 2 Asbestos Abatement and Zone 42 and 43 Fluorine System Hazard Stabilization

Perform all necessary activities to abate asbestos from Sector 2 of C-410 Complex, in compliance with substantive requirements of Commonwealth of Kentucky regulations for demolition projects. This includes removal of thermal surfacing insulation from piping and vessels, ductwork, and equipment; removal of transite or other asbestos interior wall panels and cable trays; asbestos insulation piping muds or mastics, and other friable asbestos requiring removal prior to facility stabilization or demolition.

Debris, including the asbestos, and any associated wastes generated during the abatement, shall be dispositioned in accordance with appropriate State and Federal Regulations and DOE Orders.

Based on review of asbestos abatement demolition standards and discussions with the Commonwealth of Kentucky, removal of asbestos insulated electrical wire contained in conduit is not required as a part of this activity, as the conduit and electrical wire can be removed during the building demolition using demolition techniques. The asbestos electrical wire and conduit is considered non-

friable demolition debris and is regulated as PCB bulk product waste.

The end state for the asbestos abatement task is that accessible asbestos will be removed, resulting in approximately 240 linear feet of asbestos insulation remaining in Sector 2. This asbestos insulation is inaccessible due to location, interferences or inaccessibility due to locations above or behind equipment or piping requiring passivation, etc. Following hazard stabilization and necessary component removal (when remaining asbestos is accessible), remaining asbestos will be removed if required to perform demolition safely and to comply with demolition regulations. Piping has been remarked using paint pens, tags, or other methods to identify expected contents based on original coloring of the removed insulation. This piping and equipment is now accessible for stabilization or removal.

Temporary Power and lighting will be left in place throughout the building, for supporting next phases of activity, and the Portable Criticality Accident Alarm System will remain in place. The Boundary Control Station currently located on the western end of the facility will remain in place and operational. Asbestos containment structures will be demolished, and removed asbestos and debris from containments will be disposed. Exterior transite walls will remain in place.

Fluorine generation systems and equipment in Sector 2 will be stabilized during this activity, up to the Boundary valves, which will remain. The HF cabinets will remain in place for stabilization and removal during the Sector 3 stabilization efforts. The hazard stabilization effort will include removing and neutralizing any residual fluorine, hydrogen fluoride, and hydrogen from these systems. Following removal of residual gases, piping and equipment that cannot be demolished with the building structure and managed as low level waste, (for example the HF piping and equipment is characteristically hazardous due to solid residue in the piping) will be removed for packaging and disposition.

Electrical equipment, ductwork and gaskets, and chemical systems other than the fluorine production systems of Zones 42 and 43 (eg. Uranium hexafluoride systems, CO2 Systems, ammonia systems, glycol systems) will remain in place for stabilization and removal under other WBS Elements.

Utility piping, conduit, pipe supports, building cranes, etc. will be left in place for demolition and disposal with the building structure.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

In addition to the above, a Sampling Analysis Plan, Quality Assurance Plan, Waste Management Plan, and Health & Safety Plan may be needed for any non-CERCLA actions.

For CERCLA actions, the appropriate FFA/CERCLA documentation will be required which will include SAP, QAP, WMP, H&S Plan, and other documents, as applicable to the action. These documents may require Regulatory approval.

The work package and other documentation are developed by personnel that charge to this project and also by personnel that charge to project support service center (i.e. QAP and RWP).

WBS 04.11.03.01.04 Sector 3 Asbestos Abatement

Perform all necessary activities to abate asbestos from Sector 3 of C-410 Complex, in compliance with substantive requirements of Commonwealth of Kentucky regulations for demolition projects. This includes removal of thermal surfacing insulation from piping and vessels, ductwork, and equipment; removal of transite or other asbestos interior wall panels and cable trays; asbestos insulation piping

muds or mastics, and other friable asbestos requiring removal prior to facility stabilization or demolition.

Debris, including the asbestos, and any associated wastes generated during the abatement, shall be dispositioned in accordance with appropriate State and Federal Regulations and DOE Orders.

Removal of asbestos insulated electrical wire contained in conduit is not required as a part of this activity, as the conduit and electrical wire can be removed during the building demolition using demolition techniques.

The end state for the asbestos abatement task is that accessible asbestos will be removed, resulting in approximately 1050 linear feet of asbestos insulation remaining in Sector 3. This asbestos insulation is inaccessible due to location, interferences or inaccessibility due to locations above or behind equipment or piping requiring passivation, etc. Following hazard stabilization and necessary component removal (when remaining asbestos is accessible), remaining asbestos will be removed if required to perform demolition safely and to comply with demolition regulations. Piping has been remarked using paint pens, tags, or other methods to identify expected contents based on original coloring of the removed insulation. This piping and equipment is now accessible for stabilization or removal.

Temporary Power and lighting will be left in place throughout the building, for supporting next phases of activity, and the Portable Criticality Accident Alarm System will remain in place. The Boundary Control Station currently located on the western end of the facility will remain in place and operational. Asbestos containment structures will be demolished, and removed asbestos and debris from containments will be disposed. Exterior transite walls will remain in place.

Electrical equipment, ductwork and gaskets, and chemical systems (eg. Uranium hexafluoride systems, fluorine and HF Systems, CO2 Systems, ammonia systems, glycol systems) will remain in place for stabilization and removal under later WBS Elements.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

In addition to the above, a Sampling Analysis Plan, Quality Assurance Plan, Waste Management Plan, and Health & Safety Plan may be needed for any non-CERCLA actions.

For CERCLA actions, the appropriate FFA/CERCLA documentation will be required which will include SAP, QAP, WMP, H&S Plan, and other documents, as applicable to the action. These documents may require Regulatory approval.

The work package and other documentation are developed by personnel that charge to this project and also by personnel that charge to project support service center (i.e. QAP and RWP).

WBS 04.11.03.01.05 Fluorine Cell Transfer

This work was completed before transition to PRS.

04.11.03.01.06 Surveillance, Maintenance and Support Activities

The contractor shall perform all surveillance and monitoring activities associated with the C410

Complex. This will include, but not be limited to, routine inspections, rodent and pest control, and minor facility repairs. Additionally, this element includes performing routine daily, quarterly, and annual surveillances of the PCAAS System, required by the Technical Safety Requirements for the facility, is included in this element.

Management of a warehouse for receipt, storage, and distribution of consumables, equipment, tools, and materials necessary to support the C-410 Complex D&D Project will be included in the S&M activity. Lease and maintenance of vehicles for transportation of personnel and for movement of materials and equipment, and lease of rental equipment is also included. Staffing of the of the radiological Boundary Control Station (maintenance of ½ body monitors, provision of radiological control technicians to support building entry and exit, hanging of monitoring pumps, routine surveys, etc) is included in this element.

Of the initial inventory of stored material located in or around the C-410 Complex, approximately 6,000 cubic feet will require further analytical sampling, characterization, and further evaluation prior to disposition. This characterization will be performed as a part of this element, to allow for completion of the packaging and disposal in later WBS elements. A specific volume of waste to be characterized is included, by the materials current location, in the Basis of Estimate Section of this WBS.

In addition to the disposition of the above referenced material, the following specific loose material items will be addressed during the hazard stabilization effort. These items will be managed with the overall facility hazard stabilization effort to allow for economies of scale of handling the similar items or utilizing similar processes in a campaign fashion.

- One spare modine cold trap
- Four alco type UF6 traps
- One technetium storage tank

Additionally, the spare parts and equipment located on the upper floors of Sector 8 (approximately 4200 cubic feet) will be removed with the building demolition phase of this project, and are excluded from this WBS Element.

The method(s) used for determining earned value for this WBS element is Level of Effort for Surveillance and Maintenance and support activities.

WBS 04.11.03.01.08 Sector 4 Fluorine System Stabilization

Perform necessary activities to stabilize and remove hazards from the fluorine production systems located in Sector 4 of the C-410 Complex (Zones 55 through 63). Fluorine was produced by dissociating hydrogen fluoride in large electrical cells, resulting generation of fluorine and hydrogen. Sector 4 included fluorine cell rooms and fluorine handling areas, as well as electrical substations needed to generate the necessary direct current to power the fluorine cells. The hazard stabilization effort will include removing and neutralizing any residual fluorine, hydrogen fluoride, and hydrogen from these systems. Following removal of residual gases, piping and equipment that cannot be demolished with the building structure and managed as low level waste, for example the HF piping and equipment is characteristically hazardous due to solid residue in the piping) will be removed for packaging and disposition.

Utility piping, conduit, pipe supports, etc. will be left in place for demolition and disposal with the building structure.

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The end-state for Sector 4 will be as follows:

- Gaseous or liquid residues will be removed from the fluorine production systems.
- Piping or equipment with solid residuals that exhibit hazardous characteristics will be removed and dispositioned. Other piping or equipment will be left in place for removal with building demolition.
- PCAAS system components located in Sector 4 and temporary power and lighting will remain in place.
- Transferable contamination on building surfaces, piping, or equipment will be decontaminated or fixed in place.
- Fixed contamination areas will be posted.
- Electrical equipment and ductwork, including gaskets, will remain in place.

Asbestos abatement must be completed in Sector 4 prior to stabilizing this Sector.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

WBS 04.11.03.01.09 Site-wide Surplus Facilities D&D Removal Notification, EE/CA, AM, and C-410 RAWP

These current approved regulatory documentation for the C-410 project includes the following:

- *Engineering Evaluation/Cost Analysis for the C-410 Complex Infrastructure at the Paducah Gaseous Diffusion Plant*, Paducah, Kentucky, DOE/OR/07/1952&D2, Rev 1
- *Action Memorandum for the C-410 Infrastructure Removal at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/OR/07-2002&D1 Rev 1
- *Removal Action Work Plan for the C-410 Complex Infrastructure D&D Project at the Paducah Gaseous Diffusion Plant,* DOE/OR/2012&D1

The scope defined under the above regulatory documentation includes removal of all equipment, piping, and materials from the C-410 facility, essentially leaving an empty structure, as a Non-time Critical Removal Action. In order to complete the D&D of the C-410 Complex, an additional set of CERCLA documents would be developed to include the structure demolition. Further, CERCLA documents would be required for additional facilities targeted to undergo D&D in the future.

In order to prevent developing multiple documents in the future, to obtain regulatory approval of the changes in the approach for the C-410 Complex (leaving some non-hazardous equipment in place for removal during the facility demolition), and to address obtain regulatory approval for demolition of the C-410 Structure, a site-wide Surplus Facilities regulatory document set will be developed under this element. This document set is intended to address several objectives:

- Modify the approach for C-410 Complex to allow leaving non-hazardous infrastructure in place for removal during facility demolition.
- Provide regulatory basis for demolition of the C-410 Structure.
- Provide a regulatory basis for performance of the D&D of other structures and facilities at the Paducah Gaseous Diffusion Plant that are identified as surplus. Examples of facilities to be addressed would include the C-340 Metals Plant, and the C-746-A Warehouse and C-746-B Warehouse (following projected completion of waste removal) would be incorporated, plus other structures or facilities that may be declared surplus prior to the initiation of D&D of the Gaseous Diffusion Plant. The actual planning and implementation of any of the facilities listed as examples are outside of the scope of this WBS Element.
- Establish screening criteria to determine applicability for inclusion of surplus facilities beyond

those specified.

The RAWP to be developed as a part of this element will focus on the C-410 Facility. Specifically, this RAWP will address modification in approach for removal of asbestos and hazardous materials, to be followed by demolition of facility with some equipment, non-hazardous items, and utility systems in place. This element will not address development of Removal Action Work Plans or specific planning for the stabilization or demolition of other facilities that are addressed by the Surplus Facilities Removal Notification, EE/CA, and Action Memorandum.

WBS 04.11.03.01.10 Fluorine (F2) System Hazard Stabilization

Fluorine systems require stabilization in Sectors 3, 5, 6, 7, and 8 as a part of this WBS Element. The stabilization of Fluorine systems in Sector 4 is included in WBS Element 04.11.03.01.08. Additionally, fluorine systems in Zones 42 and 43 of Sector 2 were stabilized as a part of WBS Element 4.11.3.1.3. Stabilization will be performed by passing wet air through the piping and equipment in a controlled manner, with pollution control devices (e.g. HF capable Negative Air Machines) capturing any HF generated during the process. Piping and equipment will be characterized, and if required to meet waste acceptance criteria, removed and disposed, based on experience gained in characterization of piping and residuals from completed fluorine system piping stabilization efforts.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

WBS 04.11.03.01.11 Hydrogen (H2) System Hazard Stabilization

Under this WBS Element, stabilization of hydrogen systems will be completed in Zones 42, 51, 52, 55, and 58. Stabilization will be performed by passing wet air through the piping and equipment in a controlled manner, with pollution control devices (e.g. HF capable Negative Air Machines) capturing any HF generated during the process. Piping and equipment will be characterized, and if required to meet waste acceptance criteria, removed and disposed, based on experience gained in characterization of piping and residuals from completed H2 system piping stabilization efforts.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

WBS 04.11.03.01.12 Hydro Fluoric Acid (HF) System Hazard Stabilization

Hydrofluoric Acid systems require stabilization in Sectors 2, 3, and 8 as a part of this WBS Element. Stabilization will be performed by passing wet air through the piping and equipment in a controlled manner, with pollution control devices (e.g. HF capable Negative Air Machines) capturing any HF generated during the process. Piping and equipment will be characterized, and if required to meet waste acceptance criteria, removed and disposed, based on experience gained in characterization of piping and residuals from completed HF system piping stabilization efforts.

The method(s) used for determining earned value for this WBS element is Actual unit completion.

DELIVERABLES

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WBS 04.11.10.02.01 D&D of C-410 Subproject Management

Element Milestones:

- None

Element Deliverables:

- Paducah Contractor Quality Assurance (QA) Project Plan
- Paducah Contractor Environmental, Safety, and Health (ES&H) Plan
- Provide input to the following reports and submittals (if applicable):
  - Monthly Project Performance Report (PPR)
  - Risk Management Plan Updates
  - Site Management Plan (SMP)
  - Semiannual Critical Analysis Report
  - Presentations
  - FFA briefings
  - Labor Standards Determinations
  - Gold Chart Performance Metrics
  - Annual updates to STP
  - Annual Compliance Agreement Report
  - Annual ISMS Update
  - Annual Work Smart Standards Update
  - Financial Reporting, Management Analysis Reporting System
  - Annual Statement of Costs Incurred and Claimed
  - FFA Semiannual Progress Report
  - Remedial Action/Regulatory Commitment Tracking Report
  - Other reports/documents, as necessary

WBS 04.11.03.01.03 Sector 2 Asbestos Abatement and Fluorine System Hazard Stabilization

Element Milestones

- Complete Sector 2 Asbestos Abatement by 9/30/09
- Complete Sector 2, Zones 42 and 43 Fluorine System Stabilization by 9/30/07.
- Complete disposition of wastes from Sector 2 by 9/30/09.

Element Deliverables

- Develop work control documents to perform asbestos abatement activities.
- Complete asbestos abatement from Sector 2 of the C-410 Complex.
- Complete disposition of waste materials generated during asbestos abatement
- Provide required notifications to the Commonwealth of Kentucky for asbestos abatement activities

WBS 04.11.03.01.04 Sector 3 Asbestos Abatement

Element Milestones

- Complete Sector 3 Asbestos Abatement by 9/30/09.
- Complete disposition of wastes from Sector 3 by 9/30/09.

Element Deliverables

- Develop work control documents to perform asbestos abatement activities.
- Complete asbestos abatement from Sector 3 of the C-410 Complex.
- Complete disposition of waste materials generated during asbestos abatement

- Provide required notifications to the Commonwealth of Kentucky for asbestos abatement activities

04.11.03.01.05 Fluorine Cell Transfer

This work was completed before transition to PRS and therefore are no Milestones.

04.11.03.01.06 Surveillance and Maintenance & Support Activities

WBS 04.11.03.01.08 Sector 4 Fluorine System Stabilization

Element Milestones
- Complete Fluorine production system hazard stabilization in Sector 4 by 9/30/09
- For wastes generated before June 30, 2009, complete disposition by September 30, 2009.

Element Deliverables
- Prepare engineering evaluations, lift plans, roof and floor loading evaluations, etc as required to perform asbestos removal.
- Develop work control documents to segregate, package, and load waste materials for shipment generated during hazard stabilization for disposition.
- Complete disposition of Sector 4 waste materials.

WBS 04.11.03.01.09 Site-wide Surplus Facilities D&D EE/CA, AM, and RAWP

Element Milestones
Planning dates for the documents are as follows. The Site Management Plan enforceable commitment dates for these are outside of the Period of Performance for this Element, and the planning dates established in the SMP are as follows:

- Issue D1 Removal Notification 7/31/2008
- Issue D1 EE/CA 11/10/08
- Issue D1 AM 4/23/2009
- Issue D1 RAWP 8/28/2009

Element Deliverables
- D1 and D2 Removal Notifications
- D1 and D2 EE/CA for Surplus Facilities
- D1 and D2 AM for Surplus Facilities
- D1 RAWP

WBS 04.11.03.01.11 Hydrogen (H2) System Hazard Stabilization

Element Milestones:
- Work completed before 9/30/09
- Wastes generated by 6/30/2009 disposed by 9/30/2009.

Element Deliverables:
- None.

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WBS 04.11.03.01.12 Hydro Fluoric Acid (HF) System Hazard Stabilization

Element Milestones:

- Work completed before 9/30/09.
- Wastes generated by 6/30/2009 disposed by 9/30/2009.

Element Deliverables:

- None.

REQUIREMENTS

- CERCLA/National Contingency Plan
- KY Hazardous Waste Permit (KY8-890-008-982)
- FFA for the Paducah Gaseous Diffusion Plant
- Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah (annual revisions)
- Applicable state and federal laws and regulations (applicable or relevant and appropriate requirements)
- Contractor ISMS
- UEO-1066, as updated - Lease Agreement with DOE and USEC, Revision 4, dated October 30, 2001
- Enclosure to GDP 95-0018, as updated - USEC and DOE Resolution of Shared Site Issues, Revision 1 dated March 30, 1998
- Applicable Contractor plans, policies, and procedures.
- Waste Acceptance Criteria for all applicable treatment and disposal facilities that were in effect on January 1, 2008.
- Applicable DOE Orders
- Applicable Federal Acquisition Regulations

It is the core value of the Contractor that the safety and health of every worker, the public at large, and our environment are the most important assets that we are entrusted to protect. To accomplish this, an ISMS, based on DOE's ISMS, has been implemented that incorporates the five core functions and is based on the eight guiding principles. The objective of ISMS is to systematically integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses Nuclear Safety, Industrial Safety, Industrial Hygiene, Occupational Health, Health Physics, and environmental issues. ISMS requirements flow-down to contractor subcontractors. The five core functions are (1) define the scope of work, (2) analyze hazards, (3) develop and implement hazard controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The eight guiding principles are (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibility, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard control tailored to work being performed, (7) operations authorization, and (8) worker involvement.

SCOPE ASSUMPTIONS

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- Based on a review of anticipated conditions, changes in the existing authorization basis for the C-410/420 Complex will be required to complete this work. An initial change has been implemented to allow for stabilization of the Modine and Alco Traps. A second change will be required to address the demolition of the facility. The current documentation addresses equipment and infrastructure removal, but does not include analysis of facility demolition.
- The SAP and Waste Management Plan presented in the RAWP developed under element 04.11.03.01.09 will be adequate for all infrastructure removal activities.
- The list of solid waste management units (SWMUs) in the SMP is an accurate representation of the SWMUs that will be monitored under this scope of work. SWMU Assessment Reports (SARs) for units located in the C-410 Complex and impacted by D&D activities will not be updated during this WBS Element.
- All regulatory documents are approved as a part of element 04.11.03.01.09 and no additional regulatory deliverables are planned. These documents (EE/CA, AM, RAWP) addressing building demolition with non-hazardous infrastructure in place will be approved by the regulatory agencies, superseding existing documents that require removal of all items down to exterior walls and building structure
- D&D operations temporarily will increase the need for S&M during removal operations.
- Historic data collection indicates that none of the building debris or infrastructure waste from the C-410 Complex will meet the Waste Acceptance Criteria for the C-746-U Landfill, due primarily to prevalence of PCB containing paint throughout the facility resulting in classification of waste as PCB Bulk Product, or the levels of radiological contamination exceeding landfill authorized limits.
- Normal non-leased construction equipment (forklifts, manlifts, ½ body monitors, hand tools, etc) used during the demolition will be retained for utilization on future D&D activities.

COMPLETION CRITERIA

The end state for this WBS Element will be as follows:

- Accessible ACM will be abated from equipment and piping in order to remove/minimize this hazard and to access piping and equipment for hazard stabilization.
- Hazardous chemicals from the following systems will be removed:
  - F2
  - HF
  - H2

- A HEPA Filtered industrial vacuum system will be procured and installed in the C-410 Complex which can be utilized to support removal of powder from the uranium powder systems, the HVAC System, and the vacuum system.
- Wastes generated before June 30, 2009 from infrastructure removal will be disposed of in accordance with appropriate regulatory requirements.
- Where cost effective, equipment or items that may be reused or recycled will be transferred to receiving projects, companies or organizations.

RISK MANAGEMENT

See Risk Management Plan for analysis.

Risk was mitigated through the following efforts:

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- Application of lessons learned from other sites, including Portsmouth, Savannah River, East Tennessee Technology Park, Sandia, Georgia Tech Research Reactor D&D, Maine Yankee, and Knolls Atomic Power Laboratory.
- Utilization of integrated work crews and the work force flexibility rules negotiated into the labor agreement to improve workforce effectiveness and flexibility.
- Integration of Waste Management support functions directly into the field project team to ensure near real time disposition of wastes, minimizing double-handling of wastes and minimizing time wastes remain in storage prior to disposition.
- Accelerating removal of loose material (equipment and material that had accumulated in the building) to provide a safer work environment for workforce.
- Focusing efforts on asbestos abatement and hazardous chemical or material removal to eliminate potential hazards to workforce and environment.
- Revising approach to allow for demolition with non-hazardous items and equipment in place, using heavy equipment, rather than manual removal of piping, conduit, and equipment.
- Adjustments to the on-site/off-site disposal ratio have been made in the baseline to account for polychlorinated biphenyls (PCB) bulk product material that originally was assumed to be landfill eligible but with higher radiological contamination than anticipated.

CERCLA AREAS AND SWMU

RAIMS No.	SWMU No.	Description	DMSA No.
	41	C-410-C Neutralization Tank	
	478	C-410/420 Feed Plant	
	494	Ash Receiver Area in C-410/420	
	495	C-410/420 Ash Receiver Shed	
	496	C-410/420 F2 filters in Northeast Mezzanine	
	497	C-410/420 F2 Cell Neutralization Room Vats	
	498	C-410/420 Sump at Column C&D-1&2	
	499	C-410/420 Sump at Column H-9&10	
	500	C-410/420 Sump at Column U-10&1 1	
	501	C-410/420 UF_6 Scale Pit Sumps A&B	
	502	C-410/420 Sump at Column U-9	
	503	C-410/420 Sump at Column G-I	
	504	C-410/420 Sump at Column L-10	
	505	C-410/420 Sump at Column A-3N	
	506	C-410/420 Sump at Column Wa-9	
	507	C-410/420 Condensate Tank Pit	
	508	C-410/420 Settling Basin	
	509	C-4 10/420 Drain pit	
	510	C-410/420 Sump at Column P&Q-2	
	511	C-410/420 Sump at Column Q&R-2	
	512	C-410/420 Sump at Column R-2	
	513	C-411 Cell Maintenance Room Sump	

BASIS OF ESTIMATE

1. Summary of Site Conditions

a. Summary

- C-410 is inactive and infrastructure removal work is ongoing in accordance with the approved RAWP. The facility has been subdivided into sectors and zones to facilitate efficient disposition. Known contaminants include low enriched uranium, trace transuranics, asbestos, and PCBs in paint and, potentially, switchgear components. Some systems are known to contain holdup material that will be rendered passive prior to component/piping removal. The potential that additional chemical and radiological hazards will be identified during infrastructure removal exists. The facility is a Category 2 Nuclear Facility with an approved safety basis authorization for infrastructure removal activities.
- The complex is contaminated with uranium oxides, uranium UF_6, heavy metals, asbestos, PCBs, refrigerants, hydrogen fluoride, TRU, and other contaminants. Waste from this facility currently is not being accepted at the C-746-U Landfill. Uranium contamination (greater than 1% by weight of uranium-235) and traces of TRU (from reactor returns) were discovered in the complex. The C-410/420 Complex is classified as a Category 2 Nuclear Facility in accordance with 10 CFR 830 for internal inventory and external criticality concerns. Any known uranium contamination at assays greater than 1% uranium have been removed; therefore there are no known Nuclear Criticality Safety (NCS) items within the C-410/420 Complex; however, NCS concerns could emerge as D&D progresses. Full personal protection equipment (PPE), including respiratory protection, is currently required for entry into the facility.

b. Major Assumptions

- Access to Limited Area is controlled by USEC; building/facility access will be controlled by PRS.
- Regulatory and reporting requirements remain static during the baseline performance period.
- PRS will provide management and technical support staff with all site-required training necessary for access and to perform work on-site.
- Management, technical support staff, and collective bargaining unit personnel requiring entry into the Limited Area without escort will require the appropriate security clearances. This WBS element will incur the cost of submitting clearance requests to DOE's Infrastructure and Security Contractor (Swift and Staley). No costs will be incurred in this WBS element for the processing of clearances by Swift and Staley or performance of investigations/evaluations by DOE.
- It is not anticipated that facility air, vacuum, and ventilation systems will require upgrade, or modification, for use by PRS.
- PRS will provide all required S & M support for facilities.
- Schedule will not be impacted by review and approval cycle for demolition EE/CA, AM, and RAWP.
- Asbestos will be shipped in intermodal containers, to Energy Solutions via truck or rail.
- Assume a 35 to 40 day turnaround on leased intermodal containers.
- Mobilization/demobilization charge for leased intermodals $606.25 each with a lease rate of $13/day each.
- Current disposal rate at EnergySolutions of Utah is $16.87/ft3 ($455.49 yd3) for oversize debris.
- Roundtrip transport for intermodals via rail to EnergySolutions of Utah at $14,750 per rail car, with 8 intermodals per car.
- Disposal at the Nevada Test Site (NTS) is planned for building demolition wastes.
- NTS remains direct funded (no per cubic foot tipping fee) for the duration of this project.
- Building debris will be shipped to NTS in intermodals with 768 cubic foot net volume.
- Intermodals rented at $300 per month and shipped at rate of $5,650 per round trip via rail to transfer station, and truck to NTS.
- Liners for intermodals used to facilitate dumping debris at NTS, at rate of $260 each.
- Roundtrip transport to NTS via truck at a cost of $7524.76 per shipment for non-rail shipments.
- Waste package certification and field waste technician role will be combined during packaging for NTS disposition.

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- All classified waste will be disposed of at NTS @ $13.06/ft3.
- Facility utilities, including electrical power, will be isolated, as necessary, by PRS prior to initiating D&D activities.
- Freon cooling system has been determined by inspection to be at zero inches mercury pressure, which meets the evacuation and recovery standard for this type system. As such, this system is considered stabilized and ready for removal. Removal of this system will occur during the building demolition.
- The production rate for pipe removal used is that found in RS Means, Facilities Construction Data, 20th Annual Edition, 2005. Activity 600-2100 on Page 521 provided a productivity rate of 50 LF per man-day for 4"-6" diameter pipe. All piping was assumed to be within 4"-6" diameter on average.
- All Other Mechanical Components: An engineering estimate of 18 man-days per piece of equipment was established. (A crew of 3 for 6 days).
- Instrument Lines: Instrument lines associated with each system were considered incidental work associated with that system.
- During system stabilization, product removal, system removal, and waste packaging, support personnel will be allocated to the workforce at a ratio of 1 supervisor, 1 radiological control technician, and 1 Safety Technician per 7 workers.

2. Estimating Methods

☐ Parametric ☐ Bottom-Up ☒ Other: Planning estimate

3. Sources of Estimating

- This estimate is based on the information provided in the statement of work, reference documents, and interviews conducted with individuals familiar with the condition and current regulatory status of the C-410/420 Complex.
- The basis of estimate for the skill/professional workforce staffing is based on PRS's experience on projects similar to the C-410 and 420 Infrastructure Removal project such as Maine Yankee and Georgia Technical Research Reactor Decommissioning, Sandia National Laboratories decommissioning projects, and Fernald Waste Pits Remedial Action Program project.
- Travel costs are based on the Federal Travel Regulations (FTR).
- Fuel, Oil, Gas, and Maintenance (FOGM) costs are based on Construction Industry Blue Book rates.
- Where Government Furnished Equipment (GFE) is not available, equipment rental costs are Shaw E&I national contract lease rates.
- Material and Other Direct Costs (ODCs) are based on vendor quotes, previous estimate for similar work on the national alliance contract, and equipment cut sheets from manufacturer's catalogs.
- Low value equipment (e.g., small hand tools, etc.) is priced as a multiplier based on personnel direct labor cost.
- Materials and supplies derived from labor estimate and types of maintenance activities required.

4. Basis of Estimate (Unescalated Values)

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WASTE VOLUMES

See attached waste performance metrics, as applicable.

PROJECT SCHEDULE

See attached schedule.

BASELINE BY YEAR

See attached Baseline by Year Report.